ADDENDUM
to
MODEL NF-105

INSTRUCTION MANUAL# 1-500783-187(1)

INTRODUCTION

This addendum reflects the circuit changes resulting from the application of Modification Kit No. 1-004489-001. The addendum is presented in sections related to the material in the NF-105 Instruction Manual Sections.

SECTION I - INTRODUCTION

The NF-105 specifications have not changed appreciably, however, the inherent stability of the equipment has been improved with the additional voltage regulation and the removal of the five 6X4 rectifier tubes. Removal of 19 watts of 6X4 heater power reduces the equipment operating temperature, resulting in improved temperature stability.

The specifications on the internal impulse generator are restated to reflect the changes made to the impulse line charging circuit:

1.	Pulse Repetition Rate:	2.5 to 2500 pulses per second
2.	Pulse Spectrum:	150 kHz to 1000MHz.
3.	Pulse Amplitude:	Variable from 30 to 97 dB above 1 uV(rms) per megahertz bandwidth.

SECTION II - OPERATION

This modification does not affect the Operation Section generally. However, the internal impulse generator is calibrated in terms of the rms value of the equivalent sine wave and measurements made of broadband signals will be in the same terms. This is in agreement with the requirements of most Military Specifications on EMI Measurements.

SECTION III - THEORY OF OPERATION

The theory of operation remains the same except as follows:

1. Voltage Regulator, A2 Assembly

The A2 assembly contains all of the rectifier diodes (CR1 through CR7) used in the -150, +145, +150, +250 and 450 voltage supply circuits required by the NF-105A and its plug-in tuners, see figure 5-1, sheet 1 of 4. The +145 volt circuit, which supplies the output stage of the audio amplifier, is not separately regulated. The +150V, +250V and 450V circuits are separately regulated by

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solid state regulating circuits mounted on terminal board A2TB2 on the A2 assembly. The +150V and +250V regulating circuits function in the same manner so only the +250V circuit will be described in detail. Transistor Q1 is the series control element. Transistor Q2 is an emitter follower which matches the output impedance of the voltage amplifier Q3 to the input impedance of the series control element. Amplifier Q3 compares the voltage of the stable reference diode CR8 with the regulated output sampling circuit R3, R4 and R5. Any change in output voltage is detected and amplified by Q3 and applied back to the series control element, varying its resistance in such a way as to oppose the original change in output voltage. Capacitor C2 by-passes noise developed by the reference diode CR9. The 450 V circuit is regulated by the zener diode string CR11 through CR14 that is mounted on terminal board TB2. Fuses F1, F2 and F3 are placed at the outputs of the +150, +250 and 450 volt regulating circuits in event of a direct short.

2. Impulse Generator

The impulse generator output line charging voltage has been increased from 300 to 450 volts to enable calibration of the spectral output in terms of the r m s value of an equivalent sine wave. To provide the higher voltage, the original full-wave rectifier circuit was changed to half-wave rectification of the full secondary output voltage of T11, see figure 5-1, sheet 1 of 4. The IG control R13 was added in series with the IG ADD TO IG LEVEL meter M3 to facilitate calibration adjustment of the impulse generator spectral output, see figure 5-1, sheet 3 of 4.

SECTION IV - MAINTENANCE

The following maintenance information will add to the existing maintenance material.

1. Setting Power Supply Voltage Levels

a. Check fuses in the A2 assembly. Fuses F1 and F3 are 1/16 Ampere and F2 is 1/8 Ampere.

b. Energize the BA-105A with an RF Tuning unit installed.

c. Measure the voltage from F1 to chassis ground with a VOM or digital voltmeter. Adjust as necessary to +250 volts with R4 control. Secure R4 locking nut after adjustment.

d. Measure the voltage from F2 to chassis ground. Adjust as necessary to +150 volts with R9 control. Secure R9 locking nut after adjustment.

e. Measure the voltage from F3 to pin 14 of TB2 with "IMPULSE GEN." switch S6 in "ON" position. The voltage should be 450 ±5%. This voltage is controlled by A2CR10 thru A2CR14 Zener diode regulator string.

f. Measure the voltage from the low potential end of R149 to chassis ground. It should measure 5.8 volts AC. Adjust R149 as required.

2. Calibration of Impulse Generator

a. Connect the output of a certified IG-115 impulse generator to the SIGNAL INPUT connector of the NF-105. Adjust the IG-115 output to exactly 80 dB above 1 uV/MHz RMS. (Be sure to use any IG-115 correct on factors required to provide an impulse output in RMS terms).

b. Use a T-1/NF-105 or T-2/NF-105 Tuning Unit in the BA-105 basic unit tuned to a frequency of 200 MHz.

c. Set the INPUT ATTENUATOR dB to the 40 dB position.

d. Set the FUNCTION SELECTOR switch to the PEAK BROADBAND position.

e. Adjust the IF GAIN control for a reference output meter indication of 10 microvolts.

f. Remove the RF cable from the IG-115 impulse generator and connect it to the IG OUTPUT connector on the BA-105 unit.

g. Set the IG LEVEL dBuV/MHz switch to the 80 position.

h. Adjust the IG RATE Hz switch and IG RATE Hz control for a pulse repetition rate of 60 pulses per second.

i. Depress the IMPULSE GENERATOR IG switch.

j. Adjust the IG VERNIER ADD TO IG LEVEL control for the same 10 microvolt reference reading on the output meter used in step (5) above.

k. Note the IG VERNIER ADD TO IG LEVEL meter reading. It should indicate "0" dB. If not adjust A2R13 control for a reading of "0" dB. Tighten A2R13 locking nut.

NOTE

If the range of A2R13 is limited, first check the voltage across A2C6, it should be 450±5% volts. Likewise, check the voltage across C207 (feed-through capacitor located at the end of a pipe rising from the impulser at an angle of approximately 45 degrees). It should measure 400 ±30 volts. If the voltages are correct, then select another resistor value for R164 (use a 2W deposited film type resistor for temperature stability).

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3. A2 Assembly Voltage Measurements

REF. SYMBOL NO.	DIODE OR TRANSISTOR TYPE	ANODE VOLTAGE	CATHODE VOLTAGE	NOMINAL EMITTER VOLTAGE	NOMINAL BASE VOLTAGE	NOMINAL COLLECTOR VOLTAGE
CR1	J12	258 V AC	360 Vdc	--	--	--
CR2	J12	258 V AC	360 Vdc	--	--	--
CR3	J12	224 V AC	198 Vdc	--	--	--
CR4	J12	224 V AC	198 Vdc	--	--	--
CR5	J12	224 V AC	-240 Vdc	--	--	--
CR6 & CR7*	J12	550 V AC	620 Vdc	--	--	--
CR8	3TZ100B	0	100 Vdc	--	--	--
CR9	JZ30B	0	30 V dc	--	--	--
CR10**	3TZ100B	350V dc	450 Vdc	--	--	--
CR11**	3TZ100B	250V dc	350 Vdc	--	--	--
CR12**	3TZ100B	150V dc	250 Vdc	--	--	--
CR13**	3TZ200B	50V dc	150 Vdc	--	--	--
CR14**	3TZ200B	0 V dc	50 Vdc	--	--	--
Q1	2N5657	--	--	250V dc	249.6Vdc	324Vdc
Q2	2N5657	--	--	249.6V dc	251 V dc	324Vdc
Q3	MJE 340	--	--	100Vdc	100.5Vdc	251Vdc
Q4	MJE340	--	--	150Vdc	150.8 Vdc	176Vdc
Q5	MJE340	--	--	150.8Vdc	151Vdc	176Vdc
Q6	MJE340	--	--	30Vdc	30.5VDC	151VDC

* CR6 & CR7 are in series, measure as through one diode.
** Measured from Juncture of C6 and CR16 instead of ground.

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SECTION V - SCHEMATIC DIAGRAMS

Schematic diagrams Figures 5-1 (sheet 1 of 4) and 5-1 (sheet 3 of 4) are included in this section. It is suggested that these be removed and substituted for the existing schematics in the main manual where applicable.

SECTION VI - PARTS LIST

The following Customer Service address should be used when ordering parts or inquiring about equipment servicing or calibration certification

Customer Serivce
Department 36
Singer Instrumentation
Los Angeles Operation
3211 South La Cienega Boulevard
Los Angeles, California 90016

The following parts are presented in two categories: (1) New parts related to added Assembly A2 and (2) Parts that have been substituted for existing components.

1. Assembly A2 Parts

SYMBOL NUMBER	DESCRIPTION	MFGR P/N	MFGR CODE	QTY
A2	Rectifier - Output Regulator	1-004476	16665	1
A2C1 andC3	Capacitor, fixed, met plastic 0.01mfd ±20%, 250V dcw Singer P/N 1-900001-001	C280AE	Amperex	2
A2C2 andC4	Capacitor, fixed, met plastic 0.1 mfd ±20%,250 V dcw Singer P/N 1-90001-013			2
A2C5	Capacitor, fixed, met paper ±20% 0.33 mfd, 600V dcw Singer P/N 1-900111-001			1
A2C6	Capacitor, fixed met plastic 0..1 mfd ±10% 600V dcw Singer P/N 1-900043-013			1
A1CR1 thru CR7	Diode, Silicon Singer P/N 1-913072-101	J12	Power Comp	7
A2CR8, CR10 thru CR13	Diode, Zener Singer P/N 1-913071-135	3TZ100B	Power Comp	5
A2CR9	Diode, Zener Singer P/N 1-913071-119	3TZ30B	Power Comp	1
A2CR14	Diode, Zener Singer P/N 1-913071-126	3TZ50B	Power Comp	1
A2F1 and F3	Fuse, cartridge: 1/16 ampm250V Singer P/N 1-924005-003	3AG 1/16		2
A2F2	Fuse, cartridge: 1/8 amp, 250V Singer P/N 1-924005-005	3AG 1/8		1
A2Q1 and Q2	Transistor Singer P/N 1-958076-001	2N5657	04713	2
A2Q3 thru Q6	Transistor Singer P/N 1-958075-001	MJE340	0713	4
A2R1	Resistor, fixed, composition 390 K ohms ±5%, 1/4W Singer P/N 1-945000-224	CB3945	01121	1

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SYMBOL NUMBER	DESCRIPTION	MFGR P/N	MFGR CODE	QTY
A2R2	Resistor, fixed, composition 68K ohms ±5%, 1/2W Singer P/N 1-945001-206	EB6835	01121	1
A2R3	Resistor, fixed, composition 220K ohms ±5%, 1/4W Singer P/N 1-945000-218	CB2245	01121	1
A2R4 and R9 and R13	Resistor, variable, composition 100K ohms ±20%, 1/4W Singer P/N 1-403328-001			4
A2R5	Resistor, fixed, composition 180K ohms ±5%, 1/4 W Singer P/N 1-945000-216	CB1845	01121	1
A2R6	Resistor, fixed, composition 39K ohms ±5%, 1/4W Singer P/N 1-945000-200	CB3935	01121	1
A2R7	Resistor, fixed, composition, 56K ohms ±5%, 1/2W Singer P/N 1-945001-204	EB5635	01121	1
A2R8	Resistor, fixed, composition 150K ohms ±5%, 1/4W Singer P/N 1-945000-214	CB1545	01121	1
A2R10	Resistor, fixed, composition 56K ohms ±5%, 1/4W Singer P/N 1-945000-204	CB5635	01121	1
A2R11	Resistor, fixed, composition, 15K ohms ±5%, 2W Singer P/N 1-945003-190	HB1035	01121	1

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